

## ABSTRACT OF THE DISCLOSURE

[0035] An improved switching regulator for implantable medical devices includes a control circuit with a capacitor divider to conserve energy, and selectable duty cycles to efficiently match the duty cycle to the charge level in a holding capacitor. The switching regulator charges the holding capacitor to commanded voltage levels, and the holding capacitor provides current for tissue stimulation. The commanded voltage level is reached by "pumping-up" the holding capacitor with the output of the switching regulator. For control purposes, the high voltage (i.e., the voltage across the holding capacitor) is divided between a fixed capacitor and a variable capacitor, and the voltage between the fixed capacitor and the variable capacitor (i.e., the divided voltage) is compared to a reference voltage. The result of the comparison is used to turn-off the switching regulator once the commanded voltage level is reached. The switching duty cycle is set to one of two values. At start-up, or when the output voltage drops below a determined threshold, a low duty cycle is used. Once the output voltage reaches the threshold, a higher duty cycle is used.